SYNTHESIS OF Au-CERIUM OXIDE FOR CATALYTIC REDUCTION OF PARA-NITROPHENOL

NUR SAKEENAH BINTI KHAIRUDIN

BACHELOR OF SCIENCE (Hons.) CHEMISTRY WITH MANAGEMENT

FACULTY OF APPLIED SCIENCES

UNIVERSITI TEKNOLOGI MARA

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Hanani binti Yazid
Supervisor
B. Sc. (Hons.) Chemistry with Management
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

_____

Dr. Siti Nurlia binti Ali
Project Coordinator
B. Sc. (Hons) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

_____

Dr. Nur Nasulhah binti Kasim
Head of Programme
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

ABSTRACT

SYNTHESIS OF Au-CERIUM OXIDE FOR CATALYTIC REDUCTION OF PARA-NITROPHENOL

The reduction of *p*-nitrophenol is a widely studied reaction and serves as an important model reaction to evaluate the catalytic activity. In this study, a facile and scalable synthesis method was employed to prepare cerium oxide support via chemical and co-precipitation, meanwhile gold (Au) was deposited on cerium oxide support via deposition-precipitation (DP) method through a controlled reduction process is presented in this thesis. The cerium oxide support was synthesized with cerium nitrate as the precursor mixed with ammonia solution and potassium carbohydrate via chemical and co-precipitation technique respectively. Furthermore, the resulting particles were characterized using FTIR showed a pure CeO_2 without impurities was produced and ICP-OES spectroscopy showed the composition of Au loading in catalyst with value 0565 and 0.349 mg/L for chemical and co-precipitation respectively. Moreover, the characterization of Au/CeO_2 catalyst by FTIR confirmed the immobilization of Au on CeO_2 support due to band shifting. The catalytic activity of *p*-nitrophenol reduction achieved 100% conversion to *p*-aminophenol for chemical and co-precipitation method with the rate constant (k) of $3.0383x10^{-3}$ and $5.103x10^{-3}$ s^{-1} respectively. The reaction kinetics were monitored using UV-visible spectroscopy. The successful reusability test for both Au/CeO2 catalysts proved that catalysts can be use again for several times.

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